Math 301: Homework 5

Due Wednesday Friday October 12 at noon

1. A *dominating set* in a graph G is a subset $S \subset V(G)$ such that every vertex in G is either in S or has a neighbor in S. Let G be a graph of minimum degree δ. Show G has a dominating set of size at most

$$\frac{n}{\delta + 1}(\log(\delta + 1) + 1).$$

2. Show that $R(4, t) = \Omega\left(\left(\frac{t}{\log t}\right)^2\right)$.

3. Let $t \geq s \geq 2$ and $k \geq 2$ be integers. Give the best lower bounds you can for the following quantities:

   (a) $\operatorname{ex}(n, K_{s,t})$.

   (b) $\operatorname{ex}(n, C_{2k})$.